

## **CLAIMS**

1       1.     A method comprising  
2                  withdrawing currency from a stack of bills for dispensing  
3                  to a customer,

4                  prior to dispensing, detecting a thickness of the withdrawn  
5                  currency by pushing a free end of an elongated finger by an  
6                  amount that corresponds to the thickness of the withdrawn  
7                  currency, and

8                  by electromagnetic coupling determining the amount of by  
9                  which the free end is pushed.

1       2.     The method of claim 1 in which the pushing of the free end  
2     is done by passing the currency between the finger and a stationary  
3     element.

1       3.     The method of claim 2 in which the finger is biased to press  
2     the currency against the stationary element.

1       4.     The method of claim 3 in which the currency is driven  
2     across the stationary element after it has been withdrawn from the  
3     stack of bills.

1       5.     The method of claim 4 in which the currency is driven  
2     across the stationary element by passing it through a nip between  
3     two rollers, the nip being spaced above the stationary element.

1       6.     The method of claim 1 in which the pushing of the free end  
2     causes rotation of the finger about an axis.

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- 1       7.       The method of claim 6 in which the amount by which the
- 2       free end is pushed is determined by relative rotation of two
- 3       inductively coupled elements.
  
- 1       8.       Apparatus comprising
- 2              a passage through which currency can be driven,
- 3              a free end of an elongated finger configured to be moved,
- 4       when the currency is driven through the passage, by a distance that
- 5       corresponds to a thickness of the currency, and
  
- 6              a pair of inductively coupled elements that are configured
- 7       to be moved relative to one another by motion of the elongated
- 8       finger to detect the distance that corresponds to the thickness of the
- 9       currency.
  
- 1       9.       The apparatus of claim 8 in which the passage comprises a
- 2       supporting surface and a space next to the supporting surface.
  
- 1       10.      The apparatus of claim 8 also including a second finger.
  
- 1       11.      The apparatus of claim 8 in which the free ends projects
- 2       generally in the direction in which the currency is driven.
  
- 1       12.      The apparatus of claim 8 in which the finger is biased
- 2       towards a side of the passage.
  
- 1       13.      The apparatus of claim 8 in which the finger is connected
- 2       to one of the inductively coupled elements.
  
- 1       14.      The apparatus of claim 8 in which the elongated finger is
- 2       spring loaded to bias the movable element.

1       15.     The apparatus of claim 6 in which one of the inductively  
2     coupled elements include paddles connected to the elongated  
3     finger.

1       16.     The apparatus of claim 15 in which the other of the  
2     inductively coupled elements is stationary and the paddles are  
3     configured to be movable and generally parallel to the stationary  
4     element.

1       17.     A method comprising  
2                  withdrawing currency from a stack of bills for dispensing  
3                  to a customer,

4                  prior to dispensing, detecting a thickness of the withdrawn  
5     currency by causing relative rotation between two inductively-  
6     coupled elements by an amount that corresponds to the thickness  
7     of the withdrawn currency,

1       18.     A double detect mechanism for a cash dispenser  
2     comprising  
3                  a passage through which currency can be driven after it is  
4     withdrawn from a money box,

5                  a finger that lies in the passage and is configured to be  
6     moved, when the currency is driven through the passage, through a  
7     distance that corresponds to the thickness of the currency,

8                  a rotational shaft connected to be rotated when the finger is  
9     moved, the rotational shaft bearing paddles, and

10           a circuit board bearing an electromagnetic element that  
11   cooperatives with the paddles to measure the amount of rotation of  
12   the rotational shaft.

1   19.   Apparatus comprising  
  
2           a paper path arranged between an opening in a money box  
3   through which currency can be withdrawn for dispensing to a  
4   customer at a dispensing location that is spaced apart from the  
5   opening in the money box, the paper path including rotational  
6   shafts arranged to transfer the currency, and

7           a housing that supports the paper path and is configured to  
8   receive the money box,

9           the housing comprising at least two parallel spaced-apart  
10   molded side walls,

11           the paper path comprising a molded wall or walls between  
12   the two parallel molded side walls.

1   20.   The apparatus of claim 19 in which the molded side walls  
2   and the third molded wall comprise separate pieces.

1   21.   The apparatus of claim 19 also including a molded top wall  
2   configured to support electromechanical drive elements, and a  
3   molded bottom wall.

1   22.   The apparatus of claim 19 also including plastic snap-in  
2   bearings mounted on the parallel side walls and configured to  
3   support ends of the rotational shafts.

- 1        23.     The apparatus of claim 19 in which the opening in the
- 2        money box is at one end of the housing, the dispensing location is
- 3        at an opposite end of the housing, and the paper path comprises a
- 4        substantially linear path between the opening in the money box and
- 5        the dispensing location.
  
- 1        24.     The apparatus of claim 23 also including a double-detect
- 2        mechanism mounted on the paper path at the money box opening,
- 3        the double-detect mechanism comprising a rotating element that is
- 4        electromagnetically coupled to a detector on a stationary element.
  
- 1        25.     A currency dispenser comprising
  
- 2              a substantially linear paper path arranged between (a) an
- 3        opening in a money box through which currency can be withdrawn
- 4        and (b) a dispensing location at which the currency can be
- 5        dispensed to a customer, the paper path comprising rotational
- 6        shafts arranged to transfer the currency,
  
- 7              a housing configured to support the paper path to receive
- 8        the money box, the housing including two parallel spaced-apart
- 9        molded side walls, a third molded side wall between the two
- 10       parallel molded side walls, a molded top wall configured to
- 11       support electromechanical drive elements, and a molded bottom
- 12       wall, the five walls being separate pieces,
  
- 13              plastic snap-in bearings mounted on the parallel side walls
- 14        and configured to support ends of the rotational shafts, and
  
- 15              a double-detect mechanism mounted on the paper path at
- 16        the money box opening, the double-detect mechanism comprising

17 a rotating element that is electromagnetically coupled to a detector  
18 on a stationary element.

1 26. A method comprising, not necessarily in the recited order:

2 using fasteners to assemble two parallel side walls and a  
3 paper path wall between the two parallel side walls to form a  
4 housing of a currency dispenser,

5 attaching plastic bearings to the two side walls to mount  
6 currency drive shafts across the paper path wall between the two  
7 side walls, and

8 attaching a double-detect mechanism on the paper path.

1 27. The method of claim 26 also including

2 using fasteners to assemble top and bottom walls as part of  
3 the housing.

1 28. The method of claim 27 in which the fasteners comprise  
2 metal screws.

1 29. The method of claim 27 in which no more than three  
2 fasteners are used to assemble the mating edges of each pair of the  
3 walls.

1 30. Apparatus comprising

2 a molded linear path having a flat supporting surface for  
3 currency being driven from a money box at one end of the path to a  
4 dispensing location at the other end of the path,

- 5           a pattern of static electricity grounding elements arranged  
6   along the path, and
- 7           coupling features configured to enable mounting of the path  
8   between two side walls of a housing of a currency dispenser.
- 1   31.   The apparatus of claim 30 in which the grounding elements  
2   comprise braided wire and metal lugs.
- 1   32.   The apparatus of claim 30 in which the pattern of  
2   grounding elements comprises spacing the grounding elements at  
3   small enough spacing to dissipate static charge.
- 1   33.   The apparatus of claim 30 also including  
2           a double-detect mechanism mounted on the paper path.
- 1   34.   The apparatus of claim 30 also including  
2           curved surfaces at opposite ends of the flat supporting  
3   surfaces, the curved surfaces being configured to direct currency  
4   from the money box onto the linear paper path and from the linear  
5   paper path to the dispensing location.
- 1   35.   A method comprising  
2           determining the presence or absence of a flaw in currency  
3   being dispensed to a customer,  
4           routing the currency either to a dispensing location or to a  
5   retention location depending on the detected presence or absence  
6   of the flaw, and

7                   causing the currency to be routed by default to the retention  
8                   location in the absence of a determination that a flaw is not  
9                   present.

1       36.     The method of claim 35 in which the flaw comprises a  
2                   double bill or a bill that is too thick or too thin.

1       37.     The method of claim 36 in which the routing is done by a  
2                   movable mechanical element.

1       38.     The method of claim 36 in which a series of bills is  
2                   dispensed one after another, and the default routing is applied only  
3                   to the first bill in the series after which the remaining bills in the  
4                   series are routed by default to the dispensing location.